213 GEOSYNTHETIC STABILIZED SUBGRADE USING GRADED AGGREGATE BASE

213.01 DESCRIPTION

This work shall consist of furnishing and installing a layer of geotextile fabric membrane and a minimum of 12 in. of graded aggregate base at undercut areas in the roadbed between the backfill material and the underlying soils sub grade to bridge unstable material and minimize the use of undercutting. This item shall only be used when specified in the contract documents or as directed by the Chief Engineer. In extremely unstable areas, the Chief Engineer may increase the thickness of the graded aggregate base course material.

213.02 MATERIALS

The geotextile fabric shall meet the requirements of the contract documents and AASHTO M 288 for Stabilization Applications and shall be listed in the National Transportation Product Evaluation Program (NTPEP) for geotextiles. The fabric shall be a woven fabric manufactured from fibers consisting of long chain synthetic polymers, composed of a minimum 95 percent by weight of polyolefins or polyesters. The fibers shall be formed into a stable network so that the filaments or yarns retain their dimensional stability relative to each other, including selvages. Geotextile fabrics manufactured with polyamide will not be allowed. The fabric shall be inert to commonly encountered chemicals and hydrocarbons, be mildew and rot resistant and conform to the following minimal physical property requirements:

Grab Strength (ASTM D-4632)	300 lbs
Puncture Strength (ASTM D-4833)	110 lbs
Trapezoid Tear Strength (ASTM D-4533)	110 lbs
Permittivity (ASTM D-4491)	0.05 sec^{-1}
Apparent Opening Size (ASTM D-4751)	.15 mm (minimum)
Elongation at Failure (ASTM D-1682)	15%
Ultraviolet stability (ASTM D-4355)	At 500 hours exposure, 50% strength retained

All values are based on minimum average roll values in the weakest principle direction.

Geotextile fabrics used for subsurface drainage, erosion control, sediment control or as a permeable separator shall meet the requirements of 822.09.Geotextile fabrics used for soils reinforcement shall be approved as part of special provisions for structural systems.

(A) Seam And Overlap. When geotextile fabrics are joined by sewing, the geotextile seam shall conform to the following:

(1) The seams shall be either “J” or Butterfly type and shall utilize a lock stitch.

(2) The seams shall conform to the tensile strength requirements for the geotextile when tested across the seam.

(3) The durability of the thread for seaming shall be at least equal to the geotextile itself.

(B) Securing Pins or Staples. Securing pins or staples shall have a minimum 10 inch length and shall be designed to securely hold the geotextile fabric in place during construction.

213.03 CONSTRUCTION REQUIREMENTS

(A) TEST STRIP. In extremely unstable areas, the Chief Engineer may direct that a test strip be constructed to determine the thickness of aggregate base layer required to stabilize the area. The test strip shall be a minimum of 100 ft in length and at least one lane wide. The Chief Engineer will determine the depths of aggregate base to be used in the test strip. Based on the results of the test strip, the Chief Engineer will determine the thickness of the aggregate base to use in subsequent construction.

(B) GRADE PREPARATION. When geo-synthetic stabilized sub grade using graded aggregate base is specified, the area where the geotextile is to be placed shall be cut to the depth shown on the contract documents or as directed by the chief Engineer. The grade upon which the geotextile is to be placed shall be brought to the line, grade and cross section specified. The grade shall be as smooth as practical and free of debris. Construction traffic on the grade shall be minimized. When ruts are formed by construction traffic, they shall be removed by reshaping the affected area. The grade shall not be overworked and shall be approved by the Chief Engineer prior to placement of the geotextile. Adequate surface drainage shall be maintained in conformance with Section 203. The Chief Engineer may waive the compaction and moisture requirements for the underlying soil on which the geotextile is to be placed.

(C) GEOTEXTILE PLACEMENT. Care should be taken in placing the geotextile so that it is not damaged during construction. Geotextile shall be placed on the prepared surface for the full width of the area to be treated. In areas where longitudinal under drain is to be placed, the geotextile shall be placed up to the edge of the proposed longitudinal under drain trench but shall not be placed where the trench is to be excavated. The geotextile shall be unrolled on the grade parallel to the base line without dragging it across the grade. Wrinkles and folds shall be removed from the geotextile by stretching and pinning. The geotextile shall be overlapped a minimum of 3 feet at roll edges and ends. Overlaps at the end of the roll shall be in the direction of aggregate placement with the roll being covered on top of the next roll. Roll ends and roll end overlaps shall be pinned a minimum of 5 ft on center. Roll edges and roll edge overlaps shall be pinned a minimum of 50 ft on center. Securing pins or staples shall have a minimum 10 inch length and shall be designed to securely hold the geosynthetic in place during construction.

For curves, the geotextile shall be folded or cut and overlapped in the direction of the turn. Folds in the geotextile shall be pinned a minimum of 5 ft on center. Damaged geotextile shall be repaired or replaced immediately as directed by the Chief Engineer at the Contractor's expense. Geotextile patches shall be overlapped a minimum of 3 ft into undamaged geotextile. Traffic, including construction equipment, is prohibited on the bare geotextile.

(D) GRADED AGGREGATE BASE PLACEMENT. Placement of the graded aggregate base shall be in conformance with 209 with the following exceptions:

(1) Placement and Spreading. Graded aggregate base shall be placed within three working days of geotextile placement. The graded aggregate base course shall be

placed with care so that the geotextile is not damaged or displaced and to ensure that the proper laps and splices are provided. The graded aggregate base shall be placed as a single lift in the thickness required to provide the specified compacted depth. The graded aggregate base shall be placed by end dumping and spreading. Construction shall be parallel to the base line. The turning of construction equipment on the graded aggregate base shall be kept to a minimum.

(2) Density Requirements. Immediately after placement, the graded aggregate base material shall be compacted to the required density in accordance with Section 203.

(3) Vibration. Graded aggregate base shall not be vibrated unless otherwise specified or directed by the Engineer.

213.04 MEASURE AND PAYMENT

Geosynthetic stabilized sub grade or base using graded aggregate base will be measured and paid for at the Contract unit price per cubic yard. The payment will be full compensation for furnishing and placing the geotextile and graded aggregate base, compaction, test strip, and for all material, labor, equipment, tools and incidentals necessary to complete the work. Excavation will be measured and paid for in conformance with Section 201.